

2019 Montana Forest Insect and Disease Conditions Report



View overlooking Stillwater State Forest

Montana's forests cover over 23 million acres and host a diverse array of insects and diseases that are natural components of forest systems. These organisms often go unnoticed until they reach outbreak status, at which point they may drastically alter conditions across large forests. Landscape scale outbreaks are frequently connected to climate, weather, and current forest conditions. The 2019 Montana Forest Insect and Disease Conditions Report provides an overview of the organisms currently impacting Montana forest resources.

In 2019 bark beetles, western spruce budworm, and Douglas-fir tussock moth had varying impacts on forests throughout Montana. Mountain pine beetle damage increased slightly in the western part of the state, but remained at near-endemic levels throughout the rest of Montana. Douglas-fir beetle and fir engraver remained active, particularly in the Northwest. Douglas-fir tussock moth reached outbreak status in the western part of the state, particularly in the areas around Missoula and Kalispell. Western spruce budworm was detected on over 500,000 acres and present in all four reporting zones of the state. White pine blister rust continued to play a significant and detrimental role in all of Montana's 5-needle pine ecosystems including limber, western white, and whitebark pine. Detection of this disease is difficult from aerial survey and complete statewide data is lacking. Nonetheless, this disease is a critical driver of forest conditions. Likewise, root disease is not readily detected from aerial survey yet influences stand structure and species composition, having lasting impacts on infected forests. Root diseases are comprised of the five most common species: armillaria, tomentosus, heterobasidion, schweinitzii, and laminated.

Report Contributors:

Amy Gannon, Montana DNRC Forest Pest Program coordinator (agannon@mt.gov)

August Kramer, Montana DNRC Forest Pest Program specialist (akramer@mt.gov)

Joel Egan, USFS Forest Health Protection group leader (joel.egan@usda.gov)

Scott Sontag, USFS Aerial Detection Survey coordinator (scott.sontag@usda.gov)



Methods

The state is divided into four reporting zones generally based on geographic boundaries: Northeast, Southeast, Northwest, and Southwest. The Continental Divide is commonly designated as an ecological boundary and was used to divide the state east-west, albeit in unbalanced halves. The USDA Forest Service (USFS) divides National Forests into seven forests, some of which are non-contiguous, and the zones were designed to encompass Forests in their entirety. The zones also include seven reservations and three State Forests. The USFS Forest Health Protection Program Aerial Detection Survey (ADS) conducts annual surveys from fixed-wing aircraft flying in grid or contour patterns across multiple ownerships of Montana forests. Data for this report was derived from aerial surveys along with ground-based observations.

Statewide Forest Pest Summary Table

Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	23,390	5,644	↔
Douglas-fir tussock moth	10,385	8,943	n/a
Mountain pine beetle	7,700	4,796	↑
Western spruce budworm	519,596	254,122	↓
Fir engraver	31,097	6,189	↑
Hemlock looper	15,179	9,582	n/a
Larch needle cast	2,246	1,816	↓
Spruce beetle	41	37	n/a

“↔” indicates continued pest activity within +/- 25% of SWA in previous year. “↑” or “↓” indicates increased or decreased pest activity < 500% of SWA in previous year. “n/a” is noted where data was insufficient to determine a trend

The actual amount of mortality from tree diseases, dwarf mistletoes, and white pine blister rust are often difficult to identify from the air, thus these agents are generally underestimated with ADS. Damage agents are not always contiguous and surveyors may collect data with slightly different methods. To account for this potential discrepancy, severity-weighting consolidates all damage into a single high severity category (severity-weighted acres, or SWA). General trends were calculated using SWA for each pest in 2019 relative to 2018.

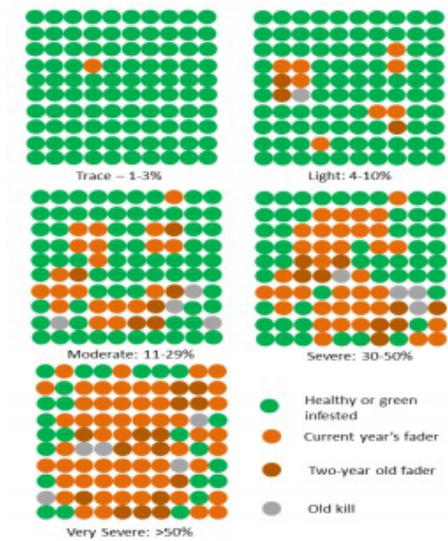
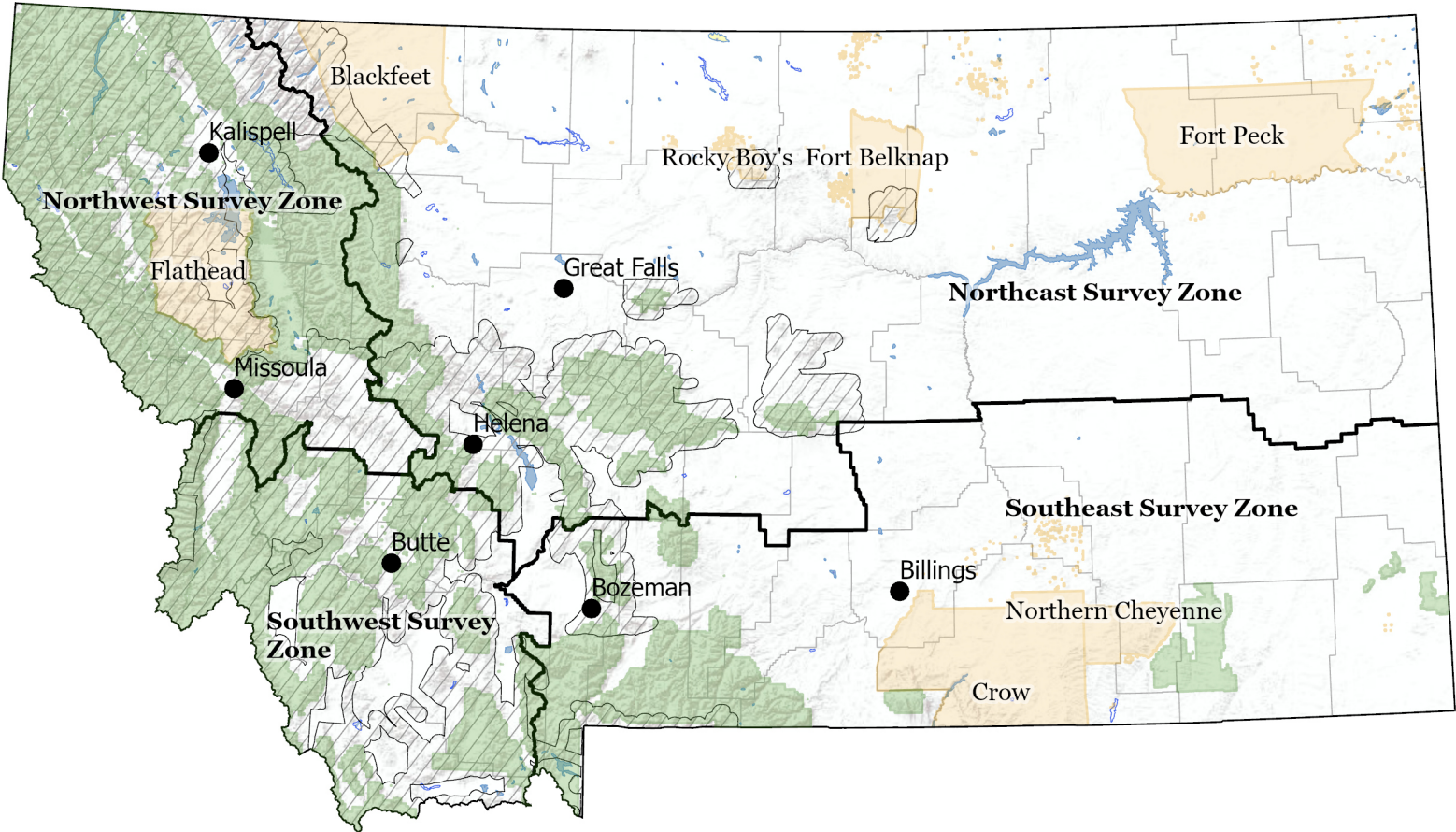


Fruiting body of heterobasidion root disease

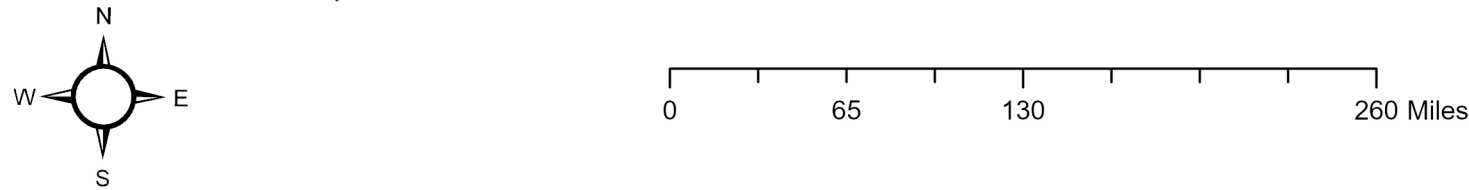


Sporulating white pine blister rust on western white pine

2019 Aerial Detection Survey Zones



Depiction of ADS data collection method



- National Forest
- Reservations
- Survey Zone Boundary
- Area Flown

Northwest Zone

The Northwest Zone encompasses the Kootenai, Flathead, and Lolo National Forests along with Coal Creek, Stillwater, and Swan State Forests and the Flathead Reservation. Western spruce budworm (*Choristoneura freemani*) was detected on 148,982 acres (72,182 SWA) throughout the region, particularly near the Northern Bitterroot, Garnet, and Nevada Ranges and the Seeley-Swan Valley. Douglas-fir tussock moth (*Orgyia pseudotsugata*) was highly active in distinct localities, particularly around Missoula, Flathead Lake, Plains, Kalispell, and Columbia Falls. In 2018, defoliation was observed in ornamental Colorado blue spruce in those areas, but no defoliation was recorded by ADS. In 2019, ADS recorded 9,845 acres (7,004 SWA) in the Northwest region. Douglas-fir beetle (*Dendroctonus pseudotsugae*) continued to spread throughout the region having at least nominal impact on 18,263 acres (4,091 SWA). Mountain pine beetle (*Dendroctonus ponderosae*) was detected on 22,792 acres (3,724 SWA). Fir engraver (*Scolytus ventralis*) continued to attack trees in northwest Montana and was detected on 32,261 acres (6,176 SWA) in 2019. Grand fir has been in decline in recent years and multiple bark beetle species in addition to fir engraver have been identified in dead and dying trees.

Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	18,263	4,091	↔
Douglas-fir tussock moth	9,845	7,004	n/a
Fir engraver	32,261	6,176	↑
Mountain pine beetle	22,792	3,724	↑
Western spruce budworm	148,982	72,182	↓

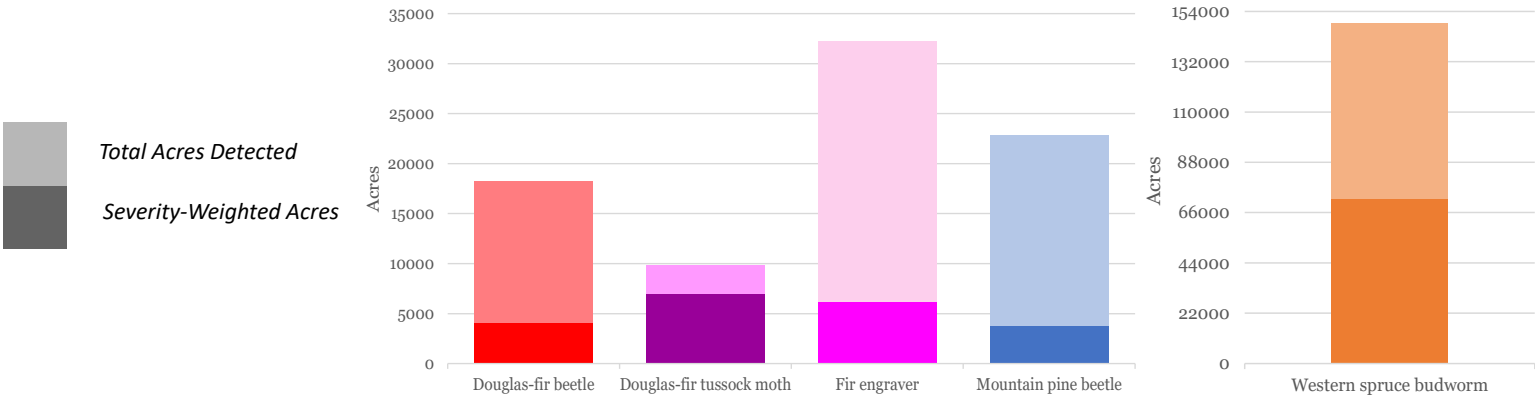


Subalpine fir and whitebark pine in the Northern Bitterroot Mountain Range

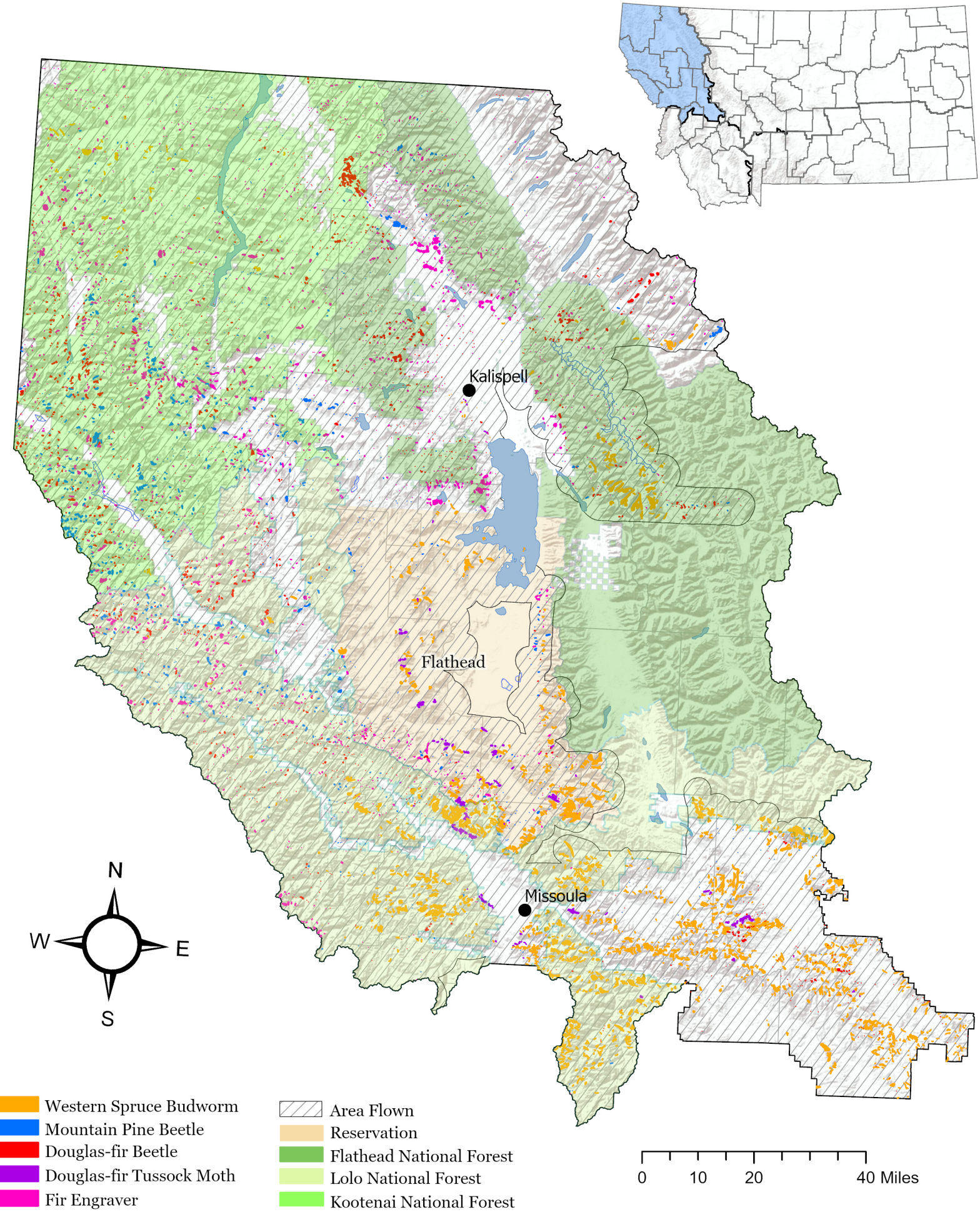


Douglas-fir tussock moth defoliation on Colorado blue spruce near Missoula

Total Acres and Severity Weighted Acres by Pest



Northwest Montana Survey Zone



Southwest Zone

The Southwest Zone encompasses the Bitterroot and Beaverhead-Deerlodge National Forests. Western spruce budworm was detected on 231,349 acres (93,848 SWA) throughout the region, notably near Ennis and Butte, and in the Pioneer, Snowcrest, Centennial, Greenhorn, Sapphire, Ruby, Tobacco Root, Gravelly, and Flint Creek Mountain Ranges. Douglas-fir beetle was detected on 1,013 acres (654 SWA) in the region, with pockets of activity detected south of Butte and west of Wisdom. Mountain pine beetle was detected at minor levels in the region and was recorded on 1,011 acres (811 SWA).

Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	1,013	654	↓
Douglas-fir tussock moth	710	429	n/a
Mountain pine beetle	1,011	811	↑
Western spruce budworm	231,349	93,848	↓

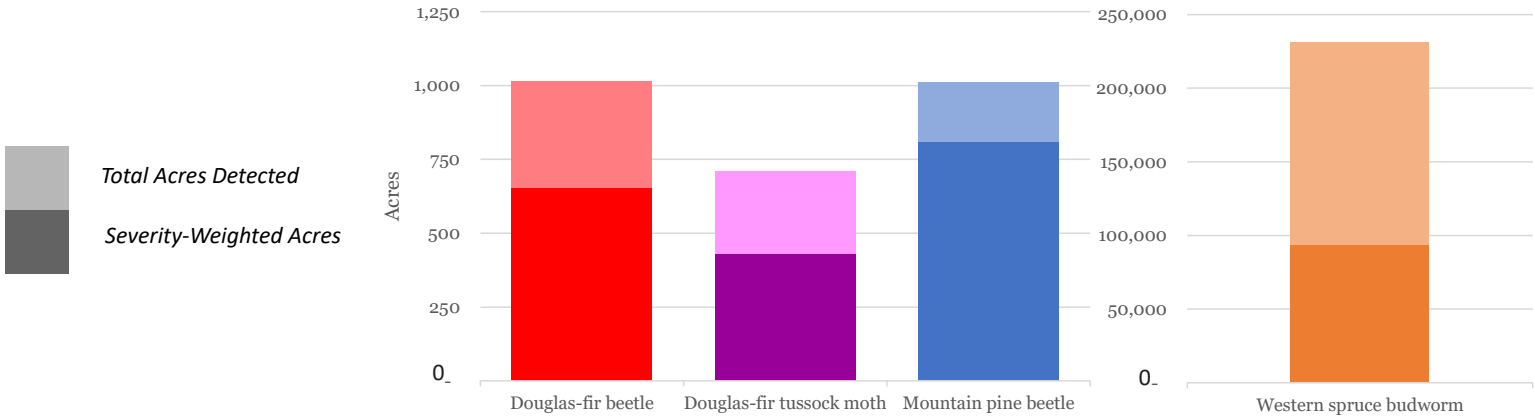


Evidence of a root disease pocket in the Bitterroot Valley

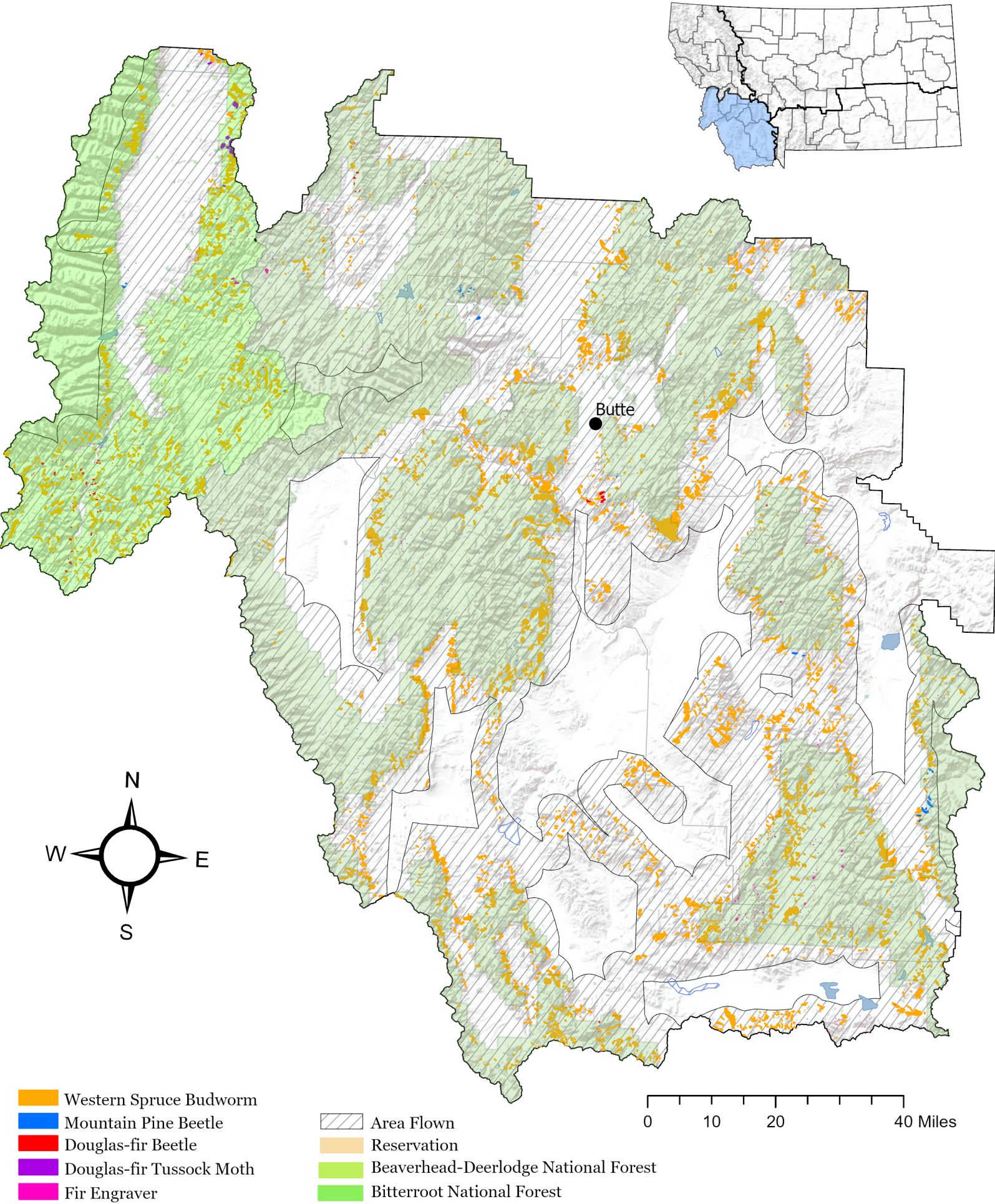


Whitebark pine growing near Miner Lakes

Total Acres and Severity Weighted Acres by Pest



Southwest Montana Survey Zone



Northeast Zone

The Northeast Zone encompasses the Helena-Lewis and Clark National Forests and the Blackfeet, Rocky Boy’s, Fort Belknap, and Fort Peck Reservations. Western spruce budworm was detected on 121,882 acres (64,819 SWA) particularly near White Sulphur Springs, in the Big Snowy Mountains, Little Belt Mountains and at distinct localities along the Rocky Mountain Front. Douglas-fir beetle continued to decrease throughout the region having a minimal impact on 4,296 acres (870 SWA). Mountain pine beetle was detected on only 862 acres (215 SWA) in the Little Rocky Mountains and Little Belt Mountains.

Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	4,296	870	↓
Douglas-fir tussock moth	619	595	n/a
Mountain pine beetle	862	215	↓
Western spruce budworm	121,882	64,819	↓

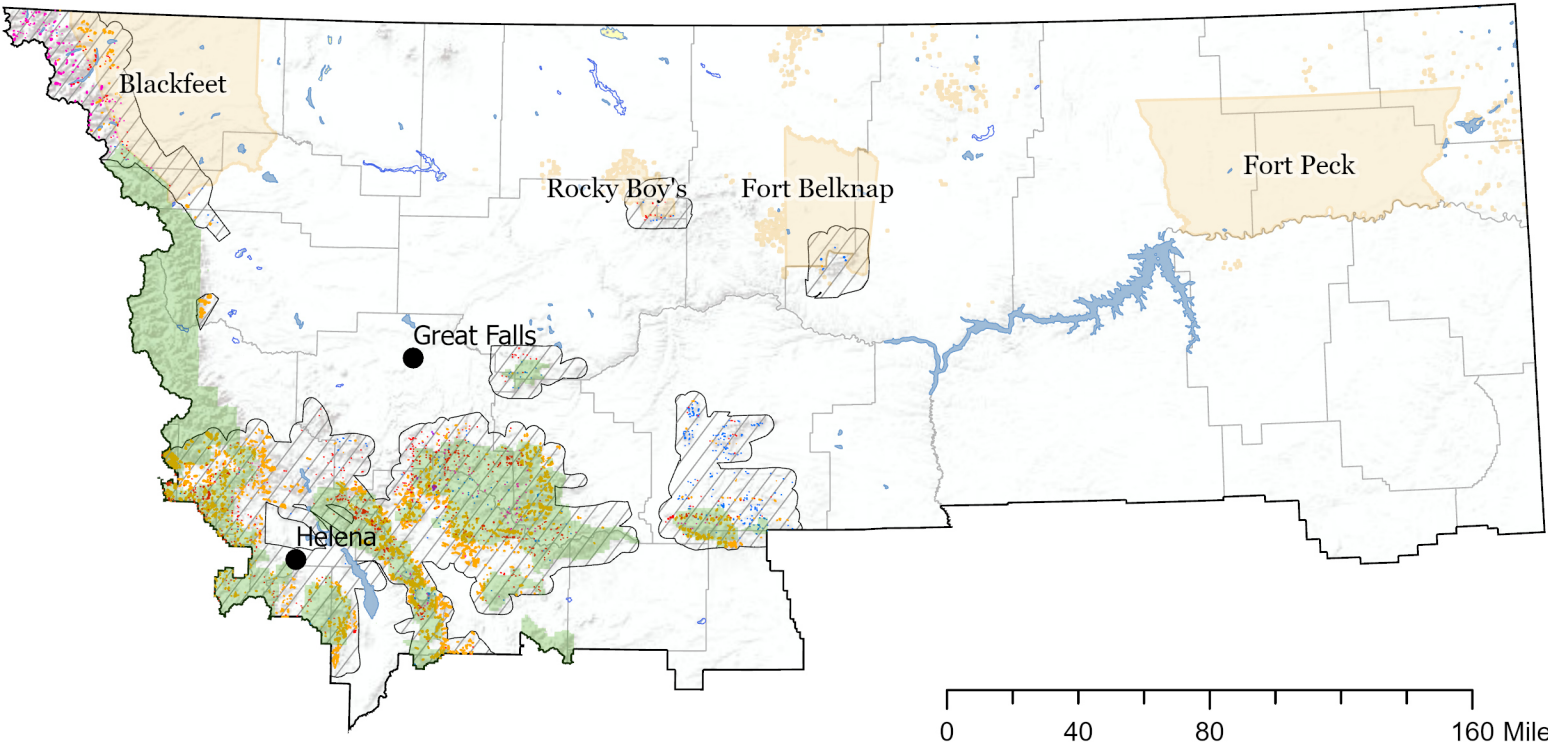
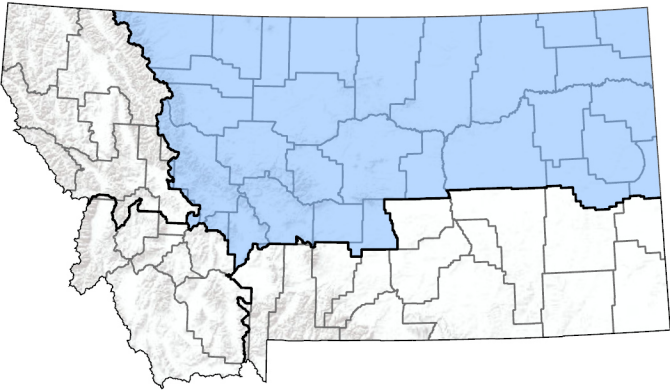


Limber pine and Douglas-fir damaged by white pine blister rust and western spruce budworm (respectively) along the Rocky Mountain Front Range

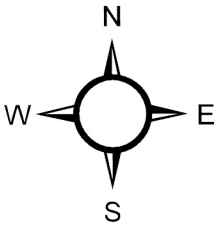
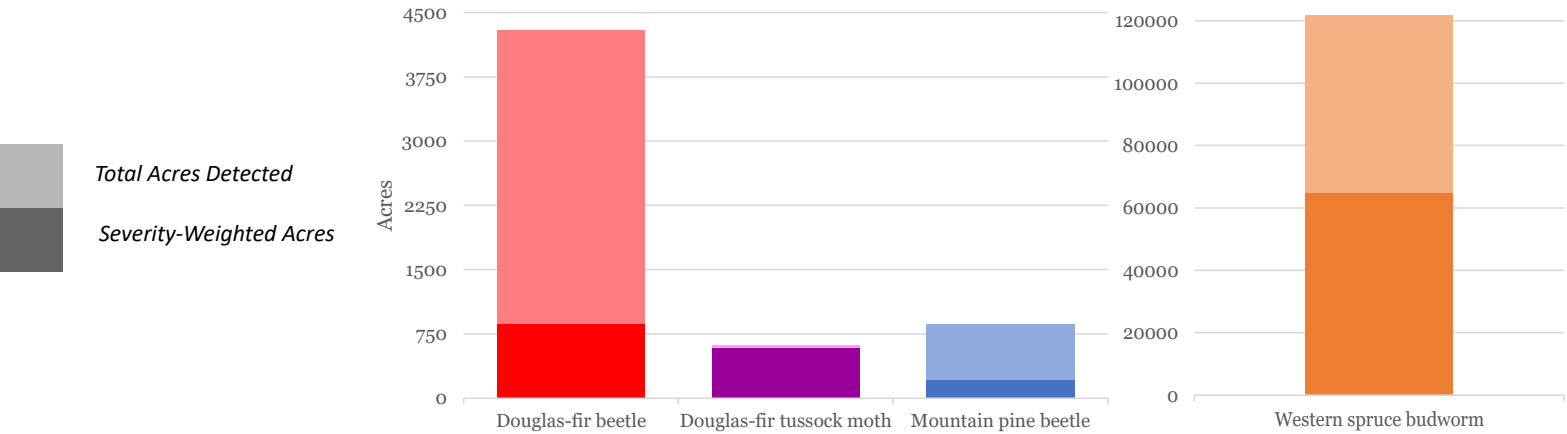


Mountain pine beetle galleries in lodgepole pine near Helena

Northeast Montana Survey Zone



Total Acres and Severity Weighted Acres by Pest



- Area Flown

Reservation

Helena-Lewis and Clark National Forest
- Western Spruce Budworm
- Mountain Pine Beetle
- Douglas-fir Beetle
- Douglas-fir Tussock Moth
- Fir Engraver

Southeast Zone

The Southeast Zone encompasses the Custer-Gallatin National Forests Crow and Northern Cheyenne Reservations. Western spruce budworm was detected on 28,817 acres (10,917 SWA). Western spruce budworm was detected most notably in the Bridger and southern Gallatin Ranges. Both Douglas-fir beetle and mountain pine beetle were detected at negligible levels in 2019. Widespread defoliation in ash trees was detected by ground survey near Baker and Wibeaux.

Damage Agents	Acres with Agent Detected	SWA	Trend
Douglas-fir beetle	35	3	↑
Mountain pine beetle	5	0	↓
Western spruce budworm	28,817	10,917	↓

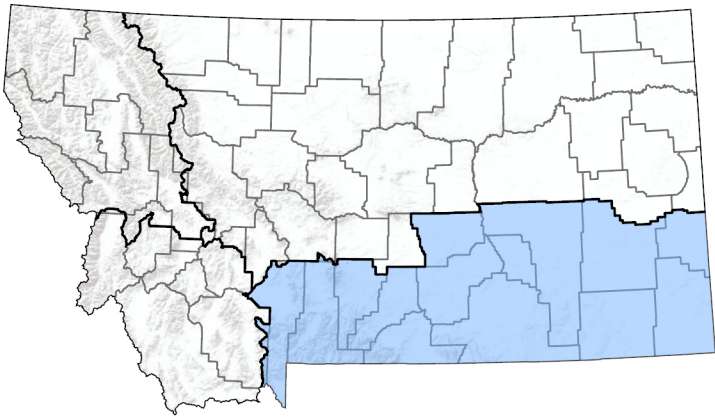


Dead and dying ash trees near Baker

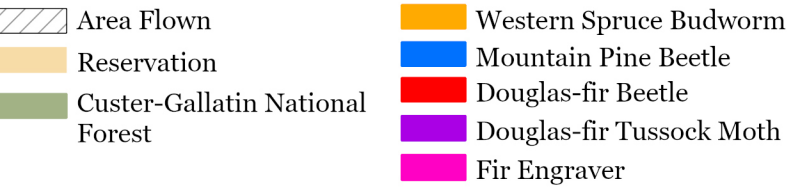
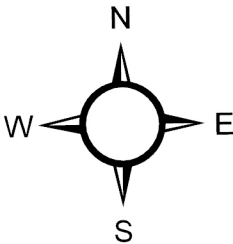
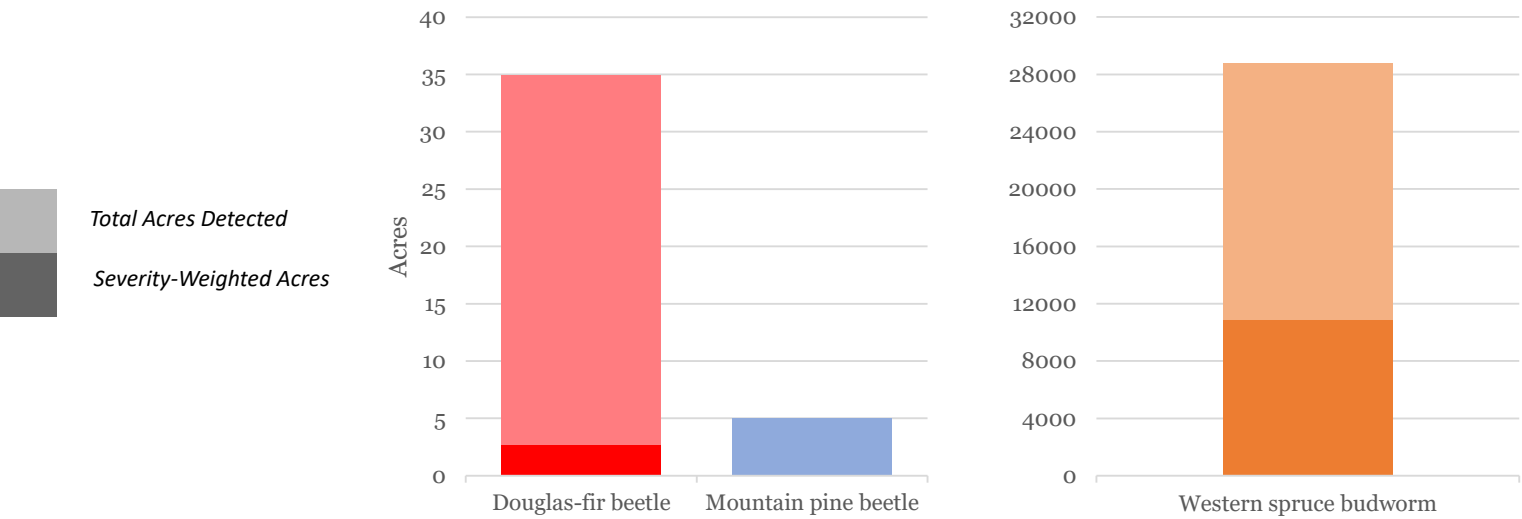


Whitebark pine mortality from white pine blister rust and mountain pine beetle near Big Sky

Southeast Montana Survey Zone



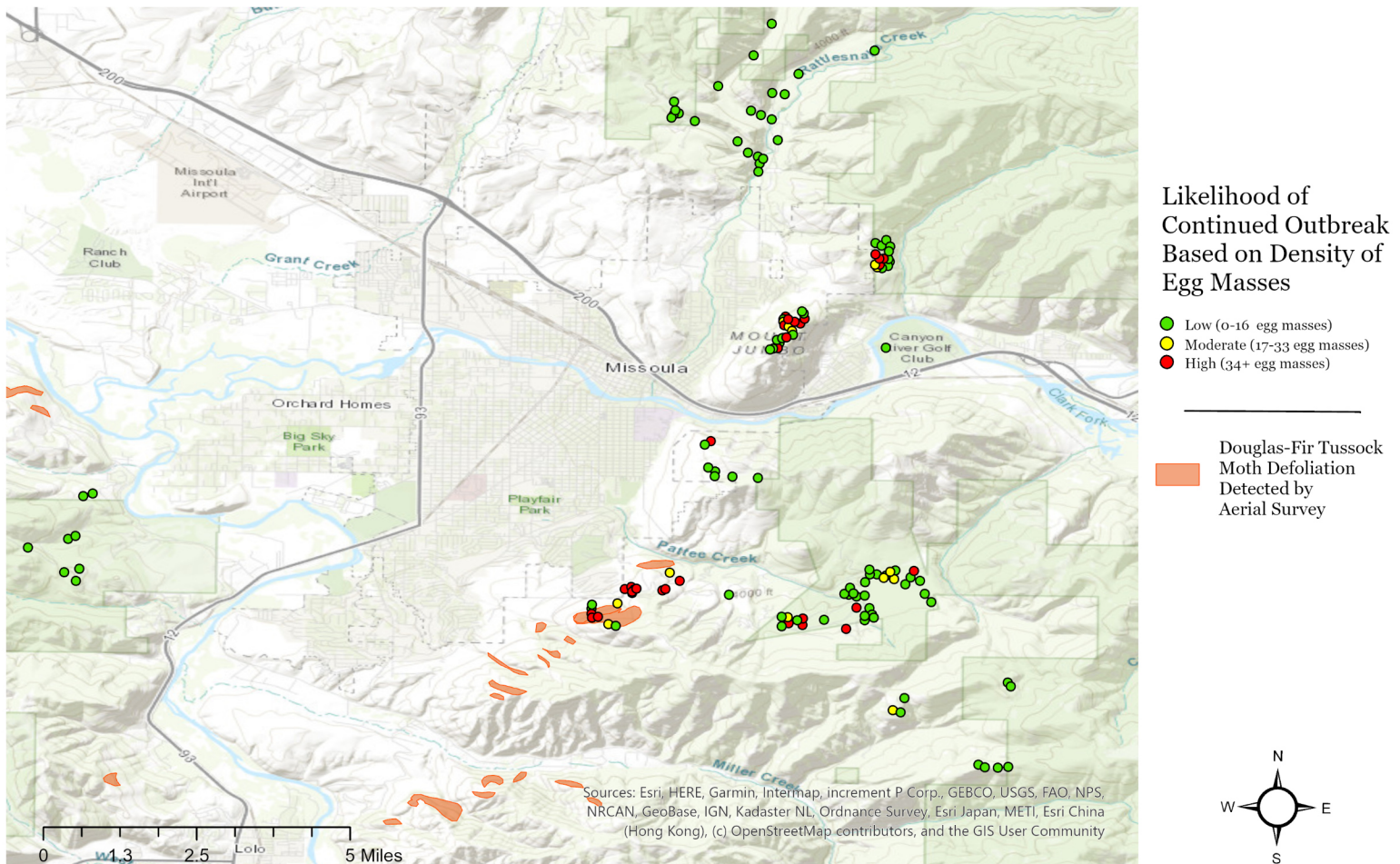
Total Acres and Severity Weighted Acres by Pest



Douglas-Fir Tussock Moth

Douglas-fir tussock moth was recorded at outbreak levels in certain parts of the state, particularly in the Northwest and Southwest reporting zones. Douglas-fir tussock moth commonly damages the tops of ornamental Colorado blue spruce in the year prior to a larger scale outbreak in surrounding forest lands. This pattern held true with damage documented in ornamental Colorado blue spruce in 2018 and widespread damage to Douglas-fir in Montana forests in 2019. Aerial survey detected defoliation attributed to Douglas-fir tussock moth on 12,184 acres. Some areas had defoliation detected in recent outbreaks, most notably in 2012, whereas no defoliation had been observed in Missoula. However, in 2019, significant defoliation was observed in Missoula near Pattee Canyon, Rattlesnake Recreation Area, Mount Jumbo, Mount Dean Stone, Blue Mountain, Black Mountain, and the Frenchtown face. In an effort to assess the status of the current outbreak, state and federal agency personnel conducted 187 egg mass surveys throughout western Montana. Density and viability of egg masses were used to identify areas that may have ongoing Douglas-fir tussock moth activity.

2019 Douglas-Fir Tussock Moth Egg Mass Surveys in the Missoula Area



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